

	Type	L #	Hits	Search Text	DBs	Time Stamp
1	BRS	L1	0	"5333184".pn.	US- PGPUB	2005/08/08 11:00
2	BRS	L2	0	"5333184".pn.	US- PGPUB	2005/08/08 11:00
3	BRS	L3	1	"5333184".pn.	USPAT	2005/08/08 12:42
4	BRS	L4	202	(initial or first) near5 funding	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:43
5	BRS	L5	11154	customer near5 (survey or interface or feedback)	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:50
6	BRS	L7	87881 9	refining or improving	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:44

	Type	L #	Hits	Search Text	DBs	Time Stamp
7	BRS	L8	2	16 and 17	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:44
8	BRS	L6	15	14 and 15	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:45
9	BRS	L9	15212	customer near5 (survey or interface or contact)	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:50

	Type	L #	Hits	Search Text	DBs	Time Stamp
10	BRS	L10	1781	17 and 19	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:50
11	BRS	L11	28	14 and 19	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:55
12	BRS	L12	9349	ipo	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:55

	Type	L #	Hits	Search Text	DBs	Time Stamp
13	BRS	L13	1	111 and 112	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:55

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2	BRS	L2	0	"5333184".pn.	US-PGPUB	2005/08/08 11:00
3	BRS	L3	1	"5333184".pn.	USPAT	2005/08/08 12:42
4	BRS	L4	202	(initial or first) near5 funding	US-PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 13:00
5	BRS	L5	11154	customer near5 (survey or interface or feedback)	US-PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:50
6	BRS	L7	87881 9	refining or improving	US-PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:44

	Type	L #	Hits	Search Text	DBs	Time Stamp
7	BRS	L8	2	16 and 17	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:44
8	BRS	L6	15	14 and 15	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:45
9	BRS	L9	15212	customer near5 (survey or interface or contact)	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:50

	Type	L #	Hits	Search Text	DBs	Time Stamp
10	BRS	L10	1781	17 and 19	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:50
11	BRS	L11	28	14 and 19	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:55
12	BRS	L12	9349	ipo	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:55

	Type	L #	Hits	Search Text	DBs	Time Stamp
13	BRS	L13	1	111 and 112	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 12:55
14	BRS	L14	0	12 and 14	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 13:00
15	BRS	L15	0	12 and 14	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 13:00

	Type	L #	Hits	Search Text	DBs	Time Stamp
16	BRS	L16	151	initial adj2 public adj3 offering	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 13:01
17	BRS	L17	3	14 and 116	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 13:02
18	BRS	L18	1	19 and 117	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 13:02

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Set	Items	Description
S1.	291143	(INITIAL OR FIRST) (S) FUNDING
S2	650246	(INITIAL (S) PUBLIC (S) OFFERING) OR IPO
S3	6222840	REVIEW?
S4	561	S1 (S) S2 (S) S3
S5	12320349	CUSTOMER OR CONSUMER OR CLIENT
S6	272	S4 (S) S5
S7	561	S1 (S) S2 (S) S3 (S) S4
S8	272	S1 (S) S2 (S) S3 (S) S5
S9	261	RD (unique items)
S10	20	S9 NOT PY>2001
S11	7716864	LAUNCH?

S12 8 S10 (S) S11
S13 506992 CUSTOMER (S) (RESPONSE OR FEEDBACK OR CONTACT)
S14 68 S4 (S) S13
S15 64 RD (unique items)
S16 9 S15 NOT PY>2002
S17 83 S4 NOT PY>2001
S18 26 S6 NOT PY>2001
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	Type	L #	Hits	Search Text	DBs	Time Stamp
1	BRS	L1	11154	customer near5 (survey or interface or feedback)	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:14
2	BRS	L2	996	(product or service or business) near5 review?	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:14
3	BRS	L4	9409	(initial adj2 public adj3 offering) or IPO	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:15

	Type	L #	Hits	Search Text	DBs	Time Stamp
4	BRS	L5	0	13 and 14	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:15
5	BRS	L6	9349	ipo	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:15
6	BRS	L7	0	13 and 16	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:15

	Type	L #	Hits	Search Text	DBs	Time Stamp
7	BRS	L8	202	(initial or first) near5 funding	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:16
8	BRS	L9	3	13 and 18	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:16
9	BRS	L3	108	11 and 12	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:36

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11	BRS	L11	58	13 and 110	US- PGPUB ; USPAT ; USOCR ; EPO; JPO; DERWE NT; IBM_T DB	2005/08/08 15:36

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Set	Items	Description
S1	123813	(INITIAL OR FIRST) (10N) FUNDING
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S9	18	S8 NOT PY>2002
S10	15	RD (unique items)

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t s5/9,k/5

5/9,K/5 (Item 1 from file: 148)
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07226163 SUPPLIER NUMBER: 15121827 (THIS IS THE FULL TEXT)
**Distributed interactive simulation: interoperability is the key to success
in simulator networking.**

Katz, Warren

Defense Electronics, v26, n4, p10(4)

April, 1994

ISSN: 0278-3479

LANGUAGE: ENGLISH

RECORD TYPE: FULLTEXT; ABSTRACT

WORD COUNT: 2600 LINE COUNT: 00214

ABSTRACT: Distributed Interactive Simulation (DIS) technology has become the standard networking protocol for Department of Defense tactical training systems and weapons evaluation. Formerly, pilots were trained in flight simulation units costing as much as \$50 million each and needing several operators to run. DIS technology allows less expensive simulators to be networked together. Commercial computer programs using the DIS standard are discussed.

TEXT:

A demonstration of the Department of Defense's (DOD's) Distributed Interactive Simulation (DIS) networking protocol, featured on the show floor of the 1993 Interservice/Industry Training Systems and Education Conference (I/ITSEC), successfully exhibited the interoperation of heterogeneous simulation architectures, and confirmed the wide acceptance of DIS technology by government and industry. I/ITSEC, held November 29 through December 2, 1993, at the Marriot World Center, Orlando, FL, was the largest training and simulation conference of the year.

The DIS Protocol enables real-time simulations to be networked together for combined-arms tactical training and weapons development. Developed over the last 10 years in several DOD-sponsored research contracts, DIS has become a cornerstone for training and procurement strategy in the military.

The History of DIS

In 1984, the Defense Advanced Research Projects Agency (DARPA), now ARPA, embarked upon an ambitious endeavor to change the way soldiers were trained. Up until that time, the average training device was a single-seat flight simulator designed for high fidelity individual skill training. These devices can cost between \$1 million to \$50 million each. Often the simulator would be more expensive than the operational vehicle it simulated. Since each simulator only accommodated a single crew, which is often one person, and the training facility required several operators to run the simulation, the cost per man-hour of training time was staggering.

The purpose of these high-fidelity simulators was to rehearse individual mission skills, platform orientation, targeting weapons and navigating. The only method available to train teams of personnel in collective or collaborative tasks, such as practicing tactics, strategies, procedures, etc., was to transport all personnel and their equipment to a real-world exercise site, which could be anywhere from the Sahara to the North Pole, and actually rehearse battle scenarios. Lack of suitable exercise sites, the inherent safety risks of operating real military equipment, and the exorbitant cost of real fuel, real ammo and real equipment repairs, made team training even more costly than mission training in high-fidelity simulators. Even if the military had the money, scheduling such large maneuvers with so many participants was a logistical

nightmare, and could only be accomplished once or twice a year.

To address this problem DARPA sponsored the SIMNET (SIMulator NETworking) program. SIMNET, which came on line in 1986, was a major paradigm shift for the training community. Instead of developing a small number of high-fidelity, multimillion-dollar simulators for part-task training, DARPA developed inexpensive \$250,000 simulators which had less fidelity than their older cousins. However, hundreds of these "selective fidelity" simulators were networked together to provide a forum for collaborative tactics development and rehearsal. "Selective fidelity" was a buzzword coined in the SIMNET program, meaning that a simulator need only be good enough to accomplish the training goal at hand. The tank simulators that SIMNET fielded, had relatively low resolution (320 X 128 pixels per vision block), a relatively low frame rate (15 Hz), no motion-base, an inexpensive fiberglass hull and a reduced set of controls.

SIMNET training facilities typically consist of several dozen vehicle simulators, data logging systems, after-action review stations, intelligent automated adversary simulators and off-line data analysis devices. When trainees close the door of their simulator they are transported to a time and place where they can rehearse tactics, refight historical battles, test hypothetical weapon systems, become familiar with enemy terrain, etc. One of the main reasons that SIMNET could so drastically reduce the fidelity of simulators and still maintain "willing suspension of disbelief" is that, for the first time, manned crews fought against other manned crews. Even with cartoonish displays, the fact that both friendly and hostile players are controlled by other humans makes the system very believable and engrossing.

SIMNET enjoyed widespread success and acclaim for its accomplishments in training cost reductions, increased quality and quantity of tactical team training and usefulness as a test-bed for new weapon concepts. The technology has been so successful that the government sponsored the DIS networking protocol standard, has mandated that all new training devices procured by the military adhere to this standard and requires most new weapon designs to be tested in a DIS environment before being fielded.

Technical Novelties of DIS

The DIS Protocol consists of some 27 different network packets which are passed between simulation nodes. The application specific information is encapsulated in TCP/IP/UDP Ethernet frames. The packets can be sent over any network media, from voice-grade phone lines to ATM switches. More bandwidth allows more entities to be supported. The packets describe things like state information of dynamic entities, combat events (firing, detonation), resupply interactions, electromagnetic emissions (light, radar, energy weapons), etc.

One of the unique novelties of this networking technology is the predictive algorithms which allow entities on the network to greatly reduce the frequency of rebroadcasts of state. Each entity broadcasts its type, location, velocity, acceleration, orientation and angular velocity. All the receiving simulators can then propagate the sending entity into the future, relieving the sending entity of the responsibility to continually rebroadcast. When the error between the exact position of the entity and the predicted position exceeds a certain threshold, the sending entity will update the network with its new kinematic state. The DIS Entity State packet, which makes up most of the network traffic in DIS, is about 140 bytes long, and is broadcast anywhere from once every 30 seconds, to four or five times per second.

This architecture provides very flexible tradeoffs between computational loading, position error and network bandwidth. If highly accurate position is required, such as in some military experiments, the error threshold can be reduced resulting in more network broadcasts of state. Conversely, if the only network bandwidth available is a 9600 baud modem, and 25 entities are required on the system, the error thresholds can

be increased, and more compute-intensive prediction algorithms can be used on the receiving ends. Figure 1 shows some sample performance curves for DIS networks. As the figure indicates, currently available bandwidth mechanisms are more than adequate for significant numbers of players to be networked from geographically dispersed sites. State-of-the-art DIS systems currently in use by ARPA are running up to 8000 entities on Ethernets, long-haul networked from several locations.

The DIS protocol is self-healing. When new players/entities enter the world, they begin to broadcast Entity State packets. If recipients have never heard from these entities before, they simply add them to their remote entity database. If entities are not heard from within five seconds, recipients will time them out, removing the entities from their remote entity database. Players can enter and leave at will without disturbing other participants (other than their appearance and disappearance), and dropped packets don't cause system failure. In this architecture there is no central server, thus no single point of failure.

Heterogeneous nodes can interact with each other using DIS. The network protocol provides a standard mechanism for communication between simulators which may have radically different architectures. An entity broadcasting an Entity State packet is simply informing the network of what kind of entity it is and its kinematic information. Two different recipients of the same Entity State packet may render the remote entity with very different levels of fidelity.

For example, a PC may render a remote F-15 with 10 flat shaded polygons, and may have an internal simulation frame rate of 5 frames per second (fps). A high-end Silicon Graphics workstation may render the same F-15 with 500 Gouraud shaded, photo-textured polygons at a rate of 60 fps.

As compared to the computational power necessary to render out-the-window images in real-time, the DIS prediction algorithms do not represent a significant load. The most expensive prediction algorithm that DIS commonly uses consumes about 100 floating point operations per remote entity per simulation frame.

Commercialization of DIS Technology

The first commercial-off-the-shelf DIS software toolkit, VR-Link[TM], developed by MaK Technologies (Cambridge, MA), was in abundant use at FITSEC. MaK is comprised of some of the original SIMNET developers. Organizations either purchased VR-Link[TM] to integrate their simulations into DIS, or wrote their own DIS interface software. Of the 48 separate organizations on the network, approximately 18 used VR-Link[TM].

VR-Link[TM] is DIS compliant, and is currently the most widely used DIS interface software in the world. The current client-base consists mostly of defense contractors and government research laboratories, but game makers and entertainment system developers are beginning to join the ranks.

The VR-Link[TM] toolkit is an object-oriented set of C++ classes, functions and data structures which implement the DIS Protocol and supporting algorithms. The user is supplied with the archive libraries and header files necessary to link the libraries with his application. Example programs are supplied to show users how to create a DIS simulation. Some of the features of the product include: data structures and accessing functions for all DIS packets, dead reckoning algorithms, database coordinate transformation functions, packet smoothing, entity filtration and prioritization, state machine support for DIS transactions, etc.

The Stealth application, built on top of VR-Link[TM], provides a 3-dimensional, out-the-window view of the battlefield on a Silicon Graphics workstation. This is useful for after-action review, demonstrations and scenario building. The Data Logger application, also built on VR-Link[TM], is essentially a network packet tape-recorder. An entire DIS exercise can be recorded by the Data Logger and replayed at a later time for after-action review, off-line data analysis, debugging, and development.

Network debugging and testing software is also included with the toolkit, providing send/receive utilities, connectivity testers and packet viewers.

Origin of VR-Link[TM]

The initial design of VR-Link[TM] was funded by the U.S. Army Simulation and Training Command (STRICOM) under the Small Business Innovation Research (SBIR) Program. The SBIR program is a three-phase program for which only small businesses are eligible. Phase I consists of a six-month feasibility study in research, design or development of useful technology for the sponsoring agency. If Phase I is successfully completed, a Phase II may be awarded. Phase II is the actual implementation of the technology designed in Phase I. Phase III is the commercialization of the developed technology and is typically funded by sources other than the government. The SBIR program was specifically designed to help small businesses productize the results of Phase II work. To support this goal, the program has the unique feature of allowing the small business to retain proprietary rights to technology developed with government funding.

After the initial Phase I design of VR-Link[TM], a proposal for a Phase II implementation was submitted by MaK to STRICOM. Until this point, the SBIR program was proceeding normally. However, MaK began to get tremendous customer interest in the end product while the Phase II proposal was still under evaluation. Instead of waiting for the government to fund Phase II, MaK forged ahead and completed a beta release of the product with internal funding. As the early versions of VR-Link[TM] began to sell, **customer feedback** and license revenues further advanced product development. VR-Link[TM] quickly became self-sufficient, requiring no further outside funding. It also filled a sorely neglected product niche in the military simulation market.

As VR-Link[TM] matured and gained momentum, the Phase II proposal required substantial reduction in scope. Development tasks were continually being completed before government funding was awarded. By the time the Phase II was awarded (over a year after submission) there were no further development tasks in the contract. Only the tasks of integrating VR-Link[TM] with existing simulations to achieve DIS compatibility remained. The labor portion of the contract was reduced by \$250,000, and the schedule accelerated by over a year.

Supporting Endeavors

MaK also participates heavily in other related SBIR research. Topics are pursued in areas which are complimentary to the current product line, or may yield related products. One of these contracts, sponsored by LTC Jim Wargo at ARPA, has resulted in two new DIS protocols, the Newtonian Protocol and the Migratory Object Protocol. The Newtonian Protocol allows the exchange of body forces between simulation entities in a distributed simulation. This will initially be used for higher fidelity combat engineering and logistics simulation, but ultimately will be used for networked force and tactile feedback in virtual reality. The Migratory Object Protocol provides a mechanism for exchanging state vectors of objects between nodes on a simulation network. This will be used for logistics simulation, weapons simulation and aggregation/deaggregation of combat units. These experimental protocols will be thoroughly tested in VR-Link[TM] before being presented to the DIS Steering Committee for inclusion in the standard.

Because MaK maintains a reserve of products and tools to build on, new projects are bootstrapped from a baseline of stable existing code. The Weapon Generation Tool (WGT, dubbed affectionately "Dial-a-Tank") is another ARPA funded SBIR (LTC Jim Wargo, Col. Steve Funk) whose goal is to develop a tool that allows non-programmers to build simulation entities from a library of software parts, through a graphical user interface. This will be used for very rapid generation of hypothetical weapons, and also for rapid creation of low-cost training simulators. The WGT was built on

VR-Link[TM] and the Stealth product, accelerating its development by many months and saving hundreds of thousands of dollars.

MaK is also in the process of establishing several Value Added Reseller (VAR) agreements with other companies who market complementary products. Among these are: Division Ltd., Paradigm Simulation Inc., Virtual Prototypes, and others.

Dual-Use Technology

MaK is transitioning VR-Link[TM] into several non-defense applications. It is currently being integrated into an Air Traffic Control training system by MITRE Corp. for the FAA. Other obvious applications are: road transportation training and research, collaborative engineering and design, multi-user arcade games and networked home-based virtual reality.

Beside the military, MaK is concentrating most of its effort in entertainment applications by developing several applications that will use the emerging Information Superhighway networking capabilities for the creation of multi-user synthetic environments in the home. While DIS technology is far from perfect, it is far more advanced than any other virtual reality networking technology available in the commercial world. With some modification, VR-Link[TM] will soon be appearing in several non-military applications.

About the Author:

Warren Katz, a the co-founder of Mak Technologies, is responsible for project engineering and program management. Katz holds dual bachelor's degrees in Mechanical and Electrical Engineering from MIT. Katz can be reached at (617) 876-8085.

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SPECIAL FEATURES: illustration; graph; chart

INDUSTRY CODES/NAMES: AERO Aerospace and Defense; ELEC Electronics

DESCRIPTORS: Distributed processing (Computers)--Innovations; Synthetic training device industry--Product development; Flight simulators--Computer programs

PRODUCT/INDUSTRY NAMES: 7372610 (Distributed DP Software Pkgs); 7372003 (Military Software); 4592000 (Pilot Training & Certification)

SIC CODES: 3699 Electrical equipment & supplies, not elsewhere classified; 7372 Prepackaged software; 8299 Schools & educational services, not elsewhere classified

FILE SEGMENT: TI File 148

... product with internal funding. As the early versions of VR-Link[TM] began to sell, **customer feedback** and license revenues further advanced product development. VR-Link[TM] quickly became self-sufficient, requiring

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Electronic journals: myths and realities

Woodward, Hazel; Rowland, Fytton; McKnight, Cliff; Meadows, Jack;
Pritchett, Carolyn

Library Management v18n3 PP: 155-162 1997 ISSN: 0143-5124 JRNL CODE:
LBM

DOC TYPE: Periodical; Feature LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 5498

DESCRIPTORS: Electronic publishing; Journals; Libraries; Studies; End users
CLASSIFICATION CODES: 8690 (CN=Publishing industry); 5220 (CN=Information
technology management); 9130 (CN=Experimental/Theoretical)
PRINT MEDIA ID: 14222

ABSTRACT: This paper considers the preliminary findings of the Cafe Jus
research project, investigating end user reactions to electronic journals.
Issues explored include: 1. access to e-journals, 2. reading habits, 3.
human factors, 4. financial implications, and 5. the future roles of
librarians, subscription agents and publishers in the electronic
environment.

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Introduction

A great deal has been written about the potential for electronic
publication over the past five years. However, much of the research about
electronic publication has been driven by technology rather than being led
by demand. The particular focus at Loughborough University has been on the
potential for network distribution of scholarly research journals. This
form of literature is peculiar in that it is driven almost entirely by its
authors rather than its readers[1] - even where the publisher is a
commercial company. A journal is published, first and foremost, because its
authors wish to publish and, secondarily, because its users wish to read
it. Publishers and editors know that if they can attract the best authors
in a field, then the academic libraries which are the major market for such
journals will be under pressure to buy them. If library budget stringency
means that journal subscriptions have to be cut, the journal cancelled is
not necessarily the one with the highest price, or the highest price

increase, although this is, of necessity, becoming a more dominant factor. More frequently, it is the journal with the lowest perceived scholarly quality which is cancelled, even if its price has not risen at all.

A significant proportion of the recent literature about electronic journals has concentrated on the views of authors and the scholarly community in general and has emphasized the scholar's role as author. Librarians' concerns have naturally focused on the difficulties of providing access to electronic journals for users, and in archiving them for future access. Commercial publishers, in the main, are concerned about protecting both their role in the scholarly communication process and their profit margins. The views of journal users themselves have been accorded comparatively little attention.

Research over the last four years in the Department of Information and Library Studies (DILS) and the Pilkington Library, undertaken by a team consisting of authors of this paper, has concentrated on the relatively unexplored area of user studies of electronic journals. Three successive projects - Elvyn[2], InfoTrain[3] and Cafe Jus - have been funded by the British Library Research and Development Department (now the British Library Research and Innovation Centre) and have examined the academic user view among other aspects, and a master's degree dissertation just completed by Ian Bell[4] has extended the work into the industrial domain by conducting a user study of electronic journals at Glaxo Wellcome Research.

Cafe Jus

The most recent of the British Library-funded projects, still in progress, is called "Commercial and free electronic journals, a user study" - Cafe Jus for short, continuing the restaurant theme which has characterized experiments in this field! This project took cognisance of the fact that many of the major commercial publishers of scholarly journals were proposing to make some or all of their existing printed journals available in parallel electronic form with effect from 1996. This offered the potential for a user study comparing readers' reactions to conventional printed journals, their electronic equivalents, and the growing number of freely available scholarly Internet journals. Loughborough University has for many years conducted research in various aspects of electronic publishing - the BLEND[5] and Quartet[6] projects being highly cited examples - and has actively adopted and promoted electronic information sources across many scholarly fields. This is due to the leadership of the Pilkington Library in this area and the very strong support of the university senior management. It is therefore an appropriate venue for such a study.

The Pilkington Library was one of the first UK academic libraries to offer an electronic journals service to its users. Some 12 months ago, a prototype electronic journals service - accessed directly from the library's World Wide Web (WWW) home page - was launched. The initial service provided a set of links to freely available scholarly Internet journals which were selected on the basis of scholarly quality (usually refereed titles) and relevance to teaching and research within the university. Since usage of the university's WWW campus-wide information service (the Loughborough University Information Gateway) is now commonplace among staff and students, this service provided a convenient and familiar gateway to the electronic journals. The service was rapidly developed to include a number of commercial journals which became available in electronic form, as well as providing links to free sample issues and to electronic journal collections elsewhere.

The original Cafe Jus research proposal sought the collaboration of a small number of publishers, who would provide their electronic journals free of charge for the experimental period, in return for **feedback** of anonymous **user** information from the project. Chapman & Hall, Carfax Publishers and Taylor & Francis agreed to come in on this basis. Subsequent to the **initial** planning of the project, the Higher Education **Funding** Council for England (HEFCE) Pilot Site Licence initiative (PSLI) was announced[7]. Under this scheme, HEFCE drew up agreements with three publishers to pay them a lump sum which is "top sliced" from the amounts paid in grant to universities. In return, the publishers agreed to make their printed journals available to higher education libraries for a subscription price that is lower than that paid by other subscribers. Furthermore, the publishers also agreed to provide varying levels of access to the electronic versions of their journals to all bona fide members of the participating institutions. The HEFCE PSLI has made available the journals of Academic Press and Institute of Physics Publishing to the Cafe Jus experiment. (The third publisher in the HEFCE scheme - Blackwell Scientific - is not starting an electronic service until 1997.) The Pilkington Library is now also subscribing to Project Muse, the electronic publishing service of the John Hopkins University Press in the USA[8], which has made further journals available to the experiment. Finally, the Pilkington Library is also a test site for the Blackwell's Electronic Journal Navigator service.

The project will investigate the use of electronic journals by four groups of users at Loughborough University: academic and research staff; research students; taught master's degree students of the 1995-96 cohort; and taught master's degree students of the 1996-97 cohort. So far, 1995-96 master's students and research students have been contacted. The intention was to study academic staff and the 1996-97 master's students before Christmas 1996.

The approach to these groups was guided by our experience in the earlier Elvyn project, when the usage of a single electronic journal across several universities was examined. This suggested that different approaches were needed for taught master's students, on the one hand, and for staff and research students on the other. A more structured approach, involving setting defined tasks to the group, worked best in providing good experience of electronic journals in a short space of time, and thus elicited informed opinion from students. (Experience with undergraduates evaluating electronic journals in the InfoTrain project was similar.) By contrast, academic staff and research students were asked to use electronic journals in a less contrived way, as part of their regular current awareness activities. This second group of users was shown how to access a number of relevant journals in short individual briefing sessions and then asked to use the electronic journals routinely, responding to the research team on a regular basis and using a diary to record their experiences.

Myths and realities

Electronic journals have been a "hot topic" within the profession recently. Although the results from Cafe Jus are incomplete and not yet ready for publication, informally from the early results, combined with those of Elvyn and InfoTrain, it is possible to comment on many of the widely held views about electronic journals (see also[9]).

Myth 1: Electronic journals will provide better access to journal articles

This statement assumes that all journal users have their own networked PC at their workplace or at home. It is certainly true that in developed

countries many academics do have a networked PC on their own desk and some personal control of the software mounted on its hard disk. However, students (both undergraduates and postgraduates) are less likely to be in this position; they will be dependent on university common-user PC laboratories. Typically they cannot store anything on the hard disks of these machines, and have to carry their own files around with them on diskettes. Moreover, as they are not entitled to put software on to these shared machines, they are dependent on the software that the university computing service or individual university department decides to mount. Thus, electronic journals that require a specialized viewer such as Adobe Acrobat or RealPage to be mounted on the user's machine may be inaccessible to students, even though the viewers are available free of charge. The disk space to mount them on local machines is not free, and there will be competition from other software packages for this space. The situation in the less-developed countries is markedly worse. Even assuming that networked PCs are available within an institution, they are unlikely to be widely available, and they do rely on an uninterrupted electricity supply!

Myth 2: Academics and researchers read journals at their office desk

The reading habits of academics, researchers and students are, in themselves, the subject of extensive research[10]. Nevertheless, it seems fair to assume that as student numbers rise and staff-student ratios worsen, academics are increasingly burdened with teaching and administration while at their workplace. Reading, requiring uninterrupted periods of time, is likely to be done elsewhere. Many staff have PCs at home as well as work, but the home machine is less likely to be networked. Journals are often read on trains or aeroplanes, a convenient form of background work that can be undertaken in those otherwise wasted periods of time, or at home. The comfort factor should also not be overlooked. When reading a printed document one can sit in a comfortable chair, shift around from time to time, and hold the paper at a convenient distance from one's eyes. The screen and the desk chair, by contrast, are in fairly fixed positions relative to each other.

Myth 3: Readers want electronic journals

In both the Elvyn project and the Cafe Jus project, the research team had difficulty in recruiting users. In Elvyn, this could be explained by the fact that only one, fairly specialized journal - Modelling and Simulation in Materials Science and Engineering - was on offer. In the Cafe Jus project, however, many electronic journals are available and new titles are constantly being added in many subject areas, but still users seem reluctant to come forward. This could be explained by a number of factors: the heavy workloads of academic and research staff; a lack of understanding of the potential of electronic journals; or simply that at the present moment in time users prefer the printed page! Certainly, at Loughborough University there is a high level of awareness of, and enthusiasm for, the potential of electronic journals among library and computing services staff, and the electronic journals service has been promoted both in library and university publications and in the library's information skills training programme. Interestingly, the situation in the high-technology research-based company examined by Bell was quite different: researchers were enthusiastic about electronic journals and seemed better prepared for them than the information services staff. It is to be hoped that the attitude of the editors of Medicine and Science in Sports and Exercise (MSSE) - a prestigious sports science journal - is not prevalent in the academic community[11, 12]. They were reported on the hyperjournal-forum discussion list, recently, as saying that the journal would not allow citation in MSSE of anything that was on the Net, and that anything made

available on the Net for public access would not be published subsequently by MSSE!

Myth 4: Electronic journals are quick and convenient to access

Network delays are commonplace, especially when European users are trying to reach North American sites in the European afternoon (American morning). Moreover, to reach a particular full text electronic article by browsing through tables of contents - which, as Elvyn showed, is the academic's preferred approach - one has to go through several screens. Taking Academic Press's Ideal service as an example, from the Ideal home page, where the user must first enter a user name and password, there are five screens from which the user must select an option before arriving at the option to select either the abstract or full text of an individual article. If each of these accesses is slow, the overall time to reach a required paper may be quite long. During the first Cafe Jus user studies in the early summer of 1996, Netscape was sometimes taking over 30 minutes to download a long ([similar]1Mb) paper, and Acrobat was not launched, and therefore text was not displayed until the whole document had arrived. More recent versions of Acrobat are better integrated with Netscape and will display text one page at a time as it arrives - but only if the publisher has coded the file to do so. As noted under Myth 1, not all potential readers have their own machine anyway, and in most universities at peak times queues form for PCs in student computer laboratories and for terminals in the library. In developing countries such difficulties are even more acute.

Myth 5: Readers know, and care, who publishes a journal

As already discussed, many commercial publishers are making their journals available on the WWW and many more will be doing so in a very short time-span. Typically, publishers' Web sites provide some sort of contents page listing of all the journals that they make available in electronic format, from which users can link to the individual journals. This is the model on which the Pilkington Library Electronic Journals Service is based. However, it is a fact of life (apparently not always appreciated by publishers) that users are interested in all journals in their subject field, not just the journals published by a particular publisher. Therefore, at present, users need to access the WWW sites of several publishers, and input different passwords, to obtain coverage in their field of interest. This is in contrast to the arrangement of a library, where all the journals on a particular subject are shelved together. While the evolving WWW journal system may appear to suit the commercial interests of publishers, it does not fit the habits of users, and therefore in the medium to long term it may not help the publishers either; no profits will be made from electronic journals that no one uses. Efforts to overcome this problem are being made by those organizations who are developing services to provide "one-stop shopping" for electronic journals; these include Blackwell's Electronic Journal Navigator, BIDS (Bath Information Data Service), JournalsOnline, ISI with their Electronic Library, and Swets with SwetsNet. The Pilkington Library is a UK pilot site for Blackwell's Electronic Journal Navigator and although it is in the early stages of development it looks to be a promising service.

Myth 6: Readers want "page integrity"

Most commercial publishers are using Adobe Acrobat and its associated file format, PDF, to display their journals on the WWW. This requires users to have the Acrobat viewer (which is available free of charge) mounted on their machines. The effect of using Acrobat or other such viewers is that the appearance of the printed page is preserved even though the text is searchable. The document thus looks like the printed one and pagination

(important for bibliographic referencing in the printed format) is maintained. Publishers tend to assume that this is desirable but scholarly opinion is divided. Some argue that provided the citation makes it clear that it is referring to either the print or electronic version, differing pagination is unimportant. Others point out that paragraph numbering would transcend the pagination debate altogether.

A further factor influencing the debate is related to screen layout - computer screens are in landscape layout while pages are in portrait. Furthermore, a screen holds far less information than a page and resolution is inferior. Experience on the InfoTrain project suggests that a different design is needed for the screen and print versions. In Cafe Jus, users found the use of the Adobe Acrobat viewer inconvenient, especially for those journals printed in a double-column layout: if a whole page is fitted on the screen the type is too small to read, while if only one column is displayed inconvenient moves around the page have to be made. In an interesting debate entitled "Ejournals v. paper" on the discussion list VPIEJ, one contributor went even further: "Most electronic journals today seem to be simply using the Net to deliver a copy of a journal which could otherwise be published on paper. The use of the PDF format for online journals is an example. This, to my mind, is not a true electronic journal".

Myth 7: Electronic journals will bypass libraries and make them redundant

Notwithstanding the above comments, the development of networked information resources has radically changed the way in which both academics and libraries operate over the last five years. For example, the escalating usage figures for the various BIDS databases[13] demonstrate that users do find it convenient to do their information searching from their own desks. However, the fact that people do not go in person to a library building does not mean that the library is without value. Libraries can do, and are doing, a great deal to facilitate users' access to electronic information by means of CD-ROM networks, WWW pages providing links to national subject databases and datasets, and the development of Web-based OPACs to provide a seamless method of information retrieval. The Pilkington Library's Electronic Journals Service is another example which makes it easy and convenient for Loughborough University users to access electronic journals. Experience with CD-ROMs suggests that users find it an inconvenience to have to use different interfaces and different software packages to look at different products. If the library can make interfaces and search procedures more uniform across a range of publishers' offerings, users will be more likely to use electronic journals.

In addition to facilitating and enhancing access to electronic information, libraries have another very important role to play in the electronic publishing scenario. While free Internet journals can be accessed by anyone without a library's intervention, subscription-based journals will need a focus in each institution to deal with aspects of selection, acquisition, payment of subscriptions, issuing of passwords, etc. Moreover, as other intermediaries enter the marketplace, as Dawson's, Blackwell's, Swets and BIDS already have, offering consolidated electronic journals services, these will need to be managed within institutions by a central service such as the library. Some publishers are also thinking of mounting their journals locally (the model used in the Elvyn experiment) rather than centrally, and this too might be a task that could fall to the library, probably in collaboration with the computer centre.

Myth 8: Electronic journals will save libraries money

There is little evidence that publishers are likely to reduce their prices

when a journal becomes electronic; indeed, the Journal of Biological Chemistry (JBC), a very large journal published by a learned society publisher, has decided from 1997 that the electronic version will be the prime product for which the standard subscription will be charged, and those libraries that still require the printed version will have to pay an additional \$200. Other publishers are being more tentative: most are keeping the printed format as the primary subscription and charging libraries an additional 10-15 per cent on top of the subscription price if they also wish to receive the electronic version. Only a small number of publishers are offering electronic journals as separate, stand-alone subscriptions; those that are have priced the electronic product at the same level as, or higher than, the printed product.

The impact of the HEFCE PSLI on the development of electronic journals is still to be determined. The initiative was launched in early 1996 and currently the Institute of Physics Publishing and Academic Press have made electronic versions of their journals available to higher education libraries. A recent survey by Veronique Mallau[14], a postgraduate student at Loughborough University, found that some 20 university libraries had made electronic journals from these publishers available via their Web sites. The evaluation of the PSLI started in September 1996, undertaken by John Fielden consultants. The outcome will, no doubt, affect future decisions on site licensing agreements between publishers and libraries.

Myth 9: Storage and dissemination of electronic journals is inexpensive or free

Although the "free" Internet journals make no charge to users for access, they are mostly very small, as a recent study by Harter and Kim[15] confirmed. One of the problems underlying the model that we investigated in the Elvyn project - where full texts of journals are mounted locally in each subscribing library - is the quite substantial cost of disk storage for holding the full text of long runs of many large journals. Although disk storage costs continue to fall, it must be remembered that simultaneous access by multiple users to all the journals at all times must be provided for, and the implications of this in hardware, network and software costs are significant. If the model of Internet access to journals held on a central publisher's server is adopted instead, as seems likely, then the implications for the required capacity of the Internet are also significant. The addition of video clips and sound to journals would add to the network burden. Already the delivery of full texts and graphics over the WWW can be very slow at peak times. In the UK, JANET and SuperJANET are paid for by top-slicing university funds and therefore appear to be free to academic users; yet the fact is frequently overlooked that universities are paying, albeit indirectly, for maintenance and improvements to the academic network. In addition, they also have to pay directly for the internal networks within their own campuses, and between them, in the case of multi-campus institutions.

Myth 10: Electronic journals will save paper

It is frequently argued that the move from printed journals to electronic journals will save large amounts of paper and therefore trees. Embedded within this statement are a number of assumptions which need careful examination. First and foremost, most electronic journal experiments show that, while users are happy to use navigational pages such as tables of contents, indexes and lists of hypertext links on the screen, when they finally arrive at a long full-text document that is of interest, they print it out. There are several reasons for this. One is that a computer screen can only hold a fairly small amount of information at a time - about a

quarter of a typical printed page's worth - and users find it more useful to be able to see a greater proportion of the document at a time. Second, reading from a screen can sometimes be difficult (depending on the screen display) and consequently tiring on the eyes. Printouts are portable and can be read anywhere; which leads neatly onto the next myth.

Myth 11: Publishers care about readers

As mentioned in the introduction, the key market to which publishers aim their journals is authors, especially those perceived as the best researchers in their specialized area. Although there are some sales to individuals (this applies particularly to learned society journals), the main revenue source is libraries, but publishers do not, in general, deal with libraries directly. Most libraries purchase their journals through subscription agents, which puts publishers even further removed from readers. This raises the interesting question as to where, and with whom, publishers are conducting their market research into electronic journals. Anecdotal evidence suggests that members of editorial boards are being consulted, but there is little evidence of wider consultation.

One area where publishers do give thought to their readers is in the area of design - significant effort is put into making printed journals ergonomically acceptable by paying attention to graphical and typographical design. However, this has not always been transposed into the electronic environment. Early results from Cafe Jus show that many users disliked the layout and typefaces used in some of the electronic versions and were therefore unwilling to read more than the abstract information on screen.

Myth 12: Electronic journals will save publishers money

It may well be, as Harnad[16], Odlyzko[17] and others contend, that a radically different scholarly information system based on "free" Internet distribution of information would be cheaper in real terms for the scholarly community overall than the present system based on journals. If, however, the less radical concept of converting the established and respected journals to an electronic form is adopted (as seems likely), it is not clear that those who publish the journals would achieve any substantial savings until they cease to print the journals altogether. Dual publication in print and electronic form actually costs more than print-only, as the costs of conversion of the file to a suitable distribution format have to be carried in addition to all the printing costs. Even when printing ceases, it can be argued that costs of refereeing, editing, graphic design and administration will still need to be borne. In the scientific, technical and medical (STM) fields, at least, it is not possible to publish journals in plain text; tables, high-resolution graphics, extended character sets and four-line maths are all needed. The existing free journals all have some overt or covert subsidy, usually in the form of the editor's time. It will be interesting to observe, over the next year, how the various eLib electronic journals such as Chemical Communications (part of the CLIC[18] project) and Internet Archaeology[19] migrate from the comfort of eLib funding to the harsher world of non-subsidized survival. It is hard to see how a substantial journal (for example, the size of Journal of Biological Chemistry, [similar]30,000 pages/year) could ever be run without full-time paid staff[20].

Myth 13. Electronic journals will make subscription agents redundant

Subscription agents currently offer a wide range of services to libraries, mainly relating to printed journals but increasingly to IT-related services

such as automated serial management systems and table of contents databases, for example, Blackwell's links to UnCover, SwetScan, etc. Subscription agents survive because it is administratively inconvenient, and therefore expensive, for libraries to deal with every publisher separately; they are the wholesalers of the journals industry. There seems no good reason to assume that it will be any more convenient for the library to have to deal with hundreds of publishers individually in the electronic era than it was in the era of print. As discussed in the previous section, a number of agents are proposing to provide a "one-stop shopping" service for electronic journals, with a uniform user interface and a single password for many different publishers' electronic journals - an apparently parallel service to that which they provide for printed journals. This assumes, of course, that commercial journals will continue and not be replaced entirely by free Internet distribution of information.

Myth 14: Only recent issues of journals are required

The half-life of information varies greatly between scholarly fields. In some subjects, if electronic publication starts now, the back file of printed issues could probably be relegated to inexpensive warehouse storage within five years. In other fields, live use of the older literature continues for many years; hence the eLib programme contains digitization projects designed to investigate the retrospective conversion of older issues to digital form. While this is interesting work, it is not actually clear whether it is necessary: might not users prefer to continue to have access to the older literature in printed form, given that it has already been purchased and bound?

Myth 15: All scholarly journals will be electronic within a few years

In a discussion on the VPIEJ e-mail list, a senior associate from the American Astronomical Society claimed: "...paper journals (particularly ones with electronic counterparts) will fade away. In astronomy, this will happen within four years. By January 1998, 95 per cent of the world's peer reviewed astronomical literature will be available online". Could this be true for all disciplines? The number of new electronic-only journals distributed over the Internet has been growing impressively quickly. Nonetheless, they still total less than 1 per cent of the number of printed scholarly journals in existence. If papers rather than journals are counted, the disparity becomes greater, since electronic-only journals attract very small numbers of papers[15]. The provision of major journals in dual form began in earnest only from 1996: indeed a paper by Hitchcock et al.[21] counting electronic STM journals at the end of 1995 was subtitled "The calm before the storm". Although several publishers now have their electronic journals services up and running, typically they have been slow to add new titles and issues to them. Nevertheless, a study for the EU[22], made before the advent of the WWW, estimated that by the year 2000, 25-30 per cent of academic journal publication would be electronic. The WWW with its user-friendly interface can only have increased that figure. The key moment will be when more than a handful of major, established and reputable journals cease to appear in print.

Epilogue

It is highly likely that 1996 will, in retrospect, turn out to be one of the landmark years in the history of the electronic journal. It was the year in which many of the mainstream publishers, especially in the STM fields, began to make their journals available electronically. If they are successful, the transition may be swift; if not, progress may be impeded - but not for long! Thus 1996 was a good year in which to undertake user studies. If users experience frustration and difficulty in their first

efforts to use electronic journals they may oppose efforts by libraries to replace printed journals by electronic ones.

References

1. Tenopir, C. "Authors and readers: the key to success or failure for electronic publications", *Library Trends*, Vol. 43 No. 4, 1995, pp. 571-91.
2. Rowland, F., McKnight, C. and Meadows, J. (Eds), *Project ELVYN: An Experiment in Electronic Journal Delivery. Facts, Figures and Findings*, Bowker Saur, London, 1995.
3. Meadows, J., Rowland, F. and Yates-Mercer, P. "An online electronic journal for teaching purposes", *ALT-J*, Association for Learning Technology Journal, n press.
4. Bell, I.D., "Issues surrounding electronic journals and their implementation within Glaxo Wellcome Research & Development", MSc dissertation, Loughborough University, 1996.
5. Shackel, B., *BLEND-9: Overview and Appraisal*, British Library Research Paper 82, 1991, British Library, London.
6. Tuck, B., McKnight, C., Hayet, M. and Archer, D., *Project Quartet*, LIR report 76, 1990, British Library, London.
7. Bekhradnia, B. "Pilot national site licence initiative for academic journals", *Serials*, Vol. 8 No. 4, 1995, pp. 247-50.
8. John Hopkins University Press, *Project Muse Online Journals*, 1996, <http://muse.jhu.edu/pricing.tml>
9. Tenopir, C. and King, D.W. "Setting the record straight on journal publishing: myth vs. reality", *Library Journal*, 15 March 1996, pp. 32-3.
10. Simpson, A., "Academic journal usage", *British Journal of Academic Librarianship*, Vol. 3 No. 1, pp. 25-36.
11. England, S.L. and Raven, P.B. "MSSE review on the Internet", *Medicine and Science in Sports and Exercise*, Vol. 28 No. 7, 1996, p. 775.
12. Anon., "Medicine and Science in Sports and Exercise Information for Authors" (Revised July 1996), *Medicine and Science in Sports and Exercise*, Vol. 28 No. 7, 1996, pp. i-viii.
13. Morrow, T. "BIDS usage figures, " paper presented to the Midlands and Yorkshire Networked Information Group, Nottingham Trent University, 26 June 1996.
14. Mallau, V., "The impact of electronic journals on library collection management: a case study of the Pilkington Library", MA dissertation, Loughborough University, 1996.
15. Harter, S.P. and Kim, H.J., "Electronic journals and scholarly communication: a citation and reference study", paper delivered at the ASIS Midyear Meeting, San Diego, CA, USA, 20-22 May, 1996; available at: [http://ezinfo.ucs.indiana.edu/\[similar\]harter/harter-asi_s96midtxt.html](http://ezinfo.ucs.indiana.edu/[similar]harter/harter-asi_s96midtxt.html)
16. Harnad, S., "Publicly retrievable FTP archives for esoteric science and scholarship: a subversive proposal", 1994, available at: [http://cogsci.soton.ac.uk/\[similar\]harnad/intpub.html](http://cogsci.soton.ac.uk/[similar]harnad/intpub.html)

17. Odlyzko, A.M. "Tragic loss or good riddance? The impending demise of traditional scholarly journals", International Journal of Human-Computer Studies, Vol. 42 No. 1, 1995, pp. 71-122.

18. Chemical Communications, electronic version available at:
<http://chemcomm.clic.ac.uk/>

19. Internet Archaeology available at: <http://intarch.york.ac.uk/>

20. Rowland, F., "The need for management of electronic journals", in Peek, R.P. and Newby, G.B. (Eds), Scholarly Publishing: The Electronic Frontier, MIT Press, Cambridge, MA, 1996, pp. 243-50.

21. Hitchcock, S., Carr, L. and Hall, W., "A survey of STM online journals 1990-95; the calm before the storm", January 1996, available at:
<http://journals.ecs.soton.c.uk/survey/survey.html>

22. Laukamm, T., Strategic Study on New Opportunities for Publishers in the Information Services Market, EC Report No. 14926 EN, 1993, pp. A13-A14..
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...TEXT: would provide their electronic journals free of charge for the experimental period, in return for **feedback** of anonymous **user** information from the project. Chapman & Hall, Carfax Publishers and Taylor & Francis agreed to come in on this basis. Subsequent to the **initial** planning of the project, the Higher Education **Funding** Council for England (HEFCE) Pilot Site Licence initiative (PSLI) was announced[7]. Under this scheme...

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Alliance & Leicester - AGM Statement

REGULATORY NEWS SERVICE

May 02, 2001

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ANNUAL GENERAL MEETING STATEMENT

The following is an extract from the report made to Alliance & Leicester plc's Annual General Meeting on 1st May.

"Progressing in Line With Plans"

Alliance & Leicester's trading performance in the first quarter of 2001 continued to be strong. Our business continues to develop in line wiever the margin for new loans has continued the upward trend seen since January 2000, and the new business margin is now higher than the average margin on the book.

"Growing Personal Customer Deposit Balances and Current Account Base"

Total personal customer deposit balances at the end of the quarter were higher than at the end of 2000, and we continue to grow our personal current account base.

"Asset Quality Remains Excellent"

Asset quality remains excellent, with mortgage arrears continuing to fall and credit indicators for unsecured personal lending showing no deterioration.

COMMERCIAL AND SME CUSTOMERS

"Growing Commercial Customer Businesses"

Business volumes in our Commercial Customers sector are also showing good growth. The volume of cash handled by Girobank continues to increase, and the volume of cash sold to businesses other than the Post Office has grown particularly strongly compared with the first quart//GB0003806493
//// 070257 02 May 01 Bromley Property - Offer Update RNS Number:9710C
Bromley Property Investments Ld 2 May 2001

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Recommended Cash Ordinary Offer
and Preference Offer

by

Deutsche Bank

on behalf of Bromley Property Investments Limited

r cent. of BPT's issued ordinary share capital. Since the announcement of the Offers, BPIL has agreed to purchase 14,737,250 BPT Ordinary Shares representing 10.03 per cent. of BPT's issued ordinary share capital. BPT therefore owns, has conditionally agreed to acquire, controls or has received valid acceptances in respect of 92,769,073 BPT Ordinary Shares representing 63.12 per cent. of BPT's issued ordinary share capital.

Deutsche Bank further announces on behalf of BPIL that by 3.00 p.m. on 1 May 2001, the first closing date of the Preference Offer, BPIL had received valid acceptances of the Preference Offer in respect of 1,057,831 BPT Preference Shares, representing approximately 68.49 per cent. of the existing issued preference share capital of BPT Ordinary Shares, representing approximately 12.05 per cent. of the issued ordinary share capital of BPT. Furthermore, on 2 August 2000, the last day prior to the

commencement of the Offer Period, persons deemed to be acting in concert with BPIL held in aggregate 379,963 BPT Ordinary Shares, representing approximately 0.3 per cent. of the issued ordinary share capital of BPT. Of the valid acceptances received by BPIL in respect of the Ordinary Offer, 360,535 Ordinary Shares, representing approximately 0.25 per cent. of the issued ordinary share capital of BPT have been received from persons acting in concert with BPIL. In add who wish to accept the Offers and have not yet done so should despatch their relevant Forms of Acceptance as soon as possible.

Words and expressions defined in the Offer Document dated 10 April 2001 shall, unless the context otherwise requires, have the same meaning when used in this announcement.

Enquiries: Deutsche Bank (Financial Adviser and Corporate Broker to BPIL) Debbie Robertson-Bond 020 7545 8000 David Church Richard Finston

Deutsche Bank, which is regulated for the conduct of investment business by The Securities and Futures Authority Limited, is acting for BPIL and for no one al securities exchange of, the United States, nor is it being made in or into Canada, Australia or Japan, and this announcement is not being mailed or otherwise distributed or sent in or into the United States, Canada, Australia or Japan. Any person (including nominees, trustees and custodians) who would, or otherwise intends to, forward this announcement to any jurisdiction outside the United Kingdom should read paragraph 6 of Part B and Part C of Appendix I to the Offer Document before taking any action.

The Loan Notes will not be listed on any stock exchange and have not been, and will not be, registered under the US Securities Act, or under the securities laws of any stat 02 May 01 Body Shop Intl. PLC - Final Results RNS Number:9711C Body Shop International PLC 2 May 2001

Embargoed until 7.00hrs 2 May 2001

THE BODY SHOP INTERNATIONAL PLC

Preliminary Results for the 53 weeks to 3 March 2001

* Worldwide retail sales up 7% to #691.4 million * Group turnover up 13% to #374.1 million * Pre-tax profit (excluding exceptional and restructuring costs) of # 25.0 million (2000: #31.5 million). * Earnings per share (excluding exceptional and restructuring costs) of 9.5 pence (2000: 10.7 pence) * Final dividend maintained at 3.8 pence, giving a total of 5.7 pence ted Angela Bawtree William Cullum / Charlotte Elston Head of Investor Relations Tel: 020 7404 5959 (from 7.00am) Tel: 01903 731500 (from 8.00am) or 01903 844040 (from 7.00am)

CEO Report

Overview

We are reporting a pre-tax profit of #25.0 million (before exceptional and restructuring costs) on turnover of #374.1 million for the 53 weeks to 3 March 2001. This is below our expectations and we are disappointed with the outcome. However, we are confident that the strategy now in place will deliver results over the medium and long term.

Last year, we did not deliver on the implementation of our strategy for three principal reasons: we experienced lower margins on new products; we did not adequately manage inventory levels during the year, which had a negative impact on warehouse and interest costs; and we focused too heavily on introducing new produ responsive to customer needs and expectations.

Results Summary

Worldwide retail sales increased by 7% to #691.4 million, with growth being achieved across all regions. Total sales growth was underpinned by 111 new store openings during the year, bringing the total to 1,841 stores by the year end. On a comparable store basis, sales were up 1% year on year, with all regions other than the UK recording positive growth.

Although group turnover increased by 13%, pre-tax profit (before exceptional and restructuring costs) was 21% lower than in the previous year at #25.0 million (2000: #31.5 million) due to the factors o million.

These comprised redundancy costs, an impairment charge relating to the assets of The Body Shop Digital, supply chain development costs and residual costs associated with the sale of the Littlehampton manufacturing business.

Net debt stood at #48.2 million at the year end, with the balance sheet showing net assets of #121.7 million.

Our continuing commitment to advocacy for social and environmental change is demonstrated in three major achievements last year. First, we saw continuing growth in our Community Trade programme, with purchases from these suppliers growing by 55% on the previous year. Secondly, we successfully launched our first biennial Human Rights Award, which provided funding totalling \$300,000 to four community-based organisations in Nicaragua, India, Brazil and Togo. Thtaking personal responsibility. The new product plan for the current year comprises a much smaller number of well-executed initiatives that are driven by market needs. We are also responding to **customer feedback** by reintroducing some of the products that have been discontinued over the past year and should be part of our product offering.

In order to meet our operating objectives, we have separated responsibility for supply chain management from the product group under the leadership of our new Supply Chain Director, Francois Salamon. This group will improve efficiencies within our supply chain by working with our suppliers to reduce product costs supported by our investment strategy. Our investment priority is new stores and store refurbishments, while we are also continuing to invest in point of sale systems to improve operational efficiencies.

Over the past few years, Europe & Middle East and Asia Pacific have been the primary drivers of new store growth. While we continue to encourage our franchisees to open stores in these regions, we are also accelerating new store investment in the UK and USA during the current year as this offers an attractive return on investment. The high sales per square foot that we continue to achieve in the UK offer the opportunity for expansion thrimarily of software and website development activity. We continue to be committed to developing our Internet strategy and will use the assets acquired from The Body Shop Digital as soon as is feasible in the light of our overall priorities. However, as the roll-out of this strategy will be slower than originally planned, the Board has taken a prudent view in fully providing against the carrying cost of these assets in this year's accounts.

Our investment strategy also includes selective reorganisation of the franchise network where appropriate. At the half year, we said that we were considering a proposal for consolidation of the franchise network within Asia Pacific. Our investment priorities have led us to decide not to pursue a consolidation at this time. However, the work we have carried out over the last few months has reinforced our belief in the underlying strength and the potential for The Body Shop in Asia Pacific.

US Joint Ventungoing structural reorganisation.

We are pleased to have completed the recruitment of our senior management team with four appointments during the year: Francois Salamon as Director of Supply Chain; Paula Levitan as General Counsel and Company Secretary; Roger Baxter as Regional Director for Europe & Middle East; and Colin Buchanan as Regional Director for Asia Pacific.

We have welcomed both Ronald de Waal and Irene Miller as Non-Executive Directors on our Board during the year, with Penny Hughes having resigned as a Non-Executive Director last summer after nearly six years on the Board.

Outlook

We know that the operational diffiche business forward, to realise more fully the potential of The Body Shop brand and to deliver increased

value to our stakeholders.

Operating and Financial Review

Retail Sales

In the 53 weeks ended 3 March 2001, total retail sales across all The Body Shop outlets grew by 7% to #691.4 million, with comparable store sales up by 1% year on year. Sales performance by region is shown below:

Total Retail Sales Comparable Store Sales

UK & Republic of Ireland + 4% - 2% Americas + 7% t ranges.

After deducting the direct costs associated with operating company-owned stores, mail order in the USA and The Body Shop Direct, the profit contribution increased by 5% to #123.9 million (2000: #117.6 million).

Other operating expenses, excluding exceptional and restructuring costs, were 12% higher at #94.5 million (2000: #84.6 million) after recognising #2.4 million in goodwill amortisation (2000: #1.6 million). Within operating expenses, central overhead costs were 8% lower at #39.5 million (2000: #43.2 million), although these savings were more than offset by increased overheads within the regional offices as these have become more fully resourced in terms of both people and systems. Operating margins (excluding exceptional and restructuring costs) were 7.9% compared with 10.0% in the previous year, with operating profit of #29.4 million (2000: #33.0 million).

The exceptional and restructuring costs of #12.2 million comprise: #4.6 milli83.6 175.7 + 4% Turnover 147.9 137.4 + 8% Operating profit 27.4 29.4 - 7%

Total retail sales growth in the UK & Republic of Ireland reflects the successful store opening programme and further development of The Body Shop Direct. On a comparable store basis (which excludes sales realised through The Body Shop Direct), sales were 2% down on the previous year reflecting lower than expected sales during the Christmas trading period, principally on new products. Strong sales growth was recorded in the Republic of Ireland, where comparable store sales grew by 7% and total sales increased by 11%, following a successful new outlet developmthe year.

The UK retail business continues to achieve a high sales density compared with its major competitors and this offers good opportunities for expansion of the existing store portfolio. Our growth strategy includes plans for new store openings in major cities and shopping centres, together with further use of new formats including station and factory outlets.

The new store design was piloted in Kensington in the second half of last year and we are now extending the trial of this store format in a further five stores. Dependant upon the continued success of the trial, rollout of the new design to a larger number of stores is pl#m #m Change Retail sales 174.5 163.5 + 7% Turnover 118.5 99.5 + 19% Operating profit 14.3 12.2 + 17%

The Americas region comprises the US business together with the rest of Americas, principally Canada. The US business is managed through a joint venture arrangement between The Body Shop and a company controlled by Adrian Bellamy, one of the Company's Executive Directors. During the year, the Company purchased the head franchise rights to Mexico together with four sfurbishments being targeted for the current year. In addition, home sales will be trialled in this market over the coming months.

Significant investment has been made in supply chain management systems in the USA, which are expected to deliver efficiencies and productivity during the current year.

Europe & Middle East

2001 2000 Shops at year end 684 636 Shop openings (net) 48 33 Company-owned stores 55 37

with the additional costs associated with operating a more fully resourced European regional office. The region is now being led by Roger Baxter, Regional Director, who was appointed during the year.

Growth of the company-owned store portfolio will be concentrated within Germany during the current year, where the opportunities for expansion are significant.

Asia Pacific

2001 2000 Shops at year end 429 398 Shop openings (net) 31 29
Company-owned stores 20 17

#m #m Change Retail sales 153.7 142.2 + 8% Turnover 43.7 35.3 + 24%
Operating profit 16.2 16.0 despite higher overheads associated with the regional office. We have recently strengthened the regional team with the appointment of Colin Buchanan as Regional Director.

Brand Development

The Body Shop has built an authority in the development of unique personal care products, based on the use of natural ingredients and drawing on a diversity of cultural knowledge from around the world. The Company aims to achieve high integrity in its product sourcing and development, to be honest about the benefits of the products that it sells and to challenge the status quo in the cosmetics industry. The Body Shop is well positioned to move forward, as we consolidate and refine the new store design trialled in a select number of sites, most recently in Kensington, London. A low cost refurbishment package which contains elements of the new design is also being rolled out.

Investment in company-owned store refurbishments, which will comprise a combination of both full refurbishments and the low cost option, is targeted to increase to approximately \$9 million in the current year from approximately \$2 million last year.

In addition to store developments, The Body Shop is also committed to developing the brand through complementary channels, part of which generated net cash flow from operating activities of \$21.4 million during the year (2000: \$31.4 million), which was utilised as follows:

2001 2000 \$m \$m Opening net (debt)/cash (17.8) 5.1 Operating cash flow 21.4 31.4 Capital expenditure (15.9) (14.2) Dividend payments (10.9) (10.9) Taxation payments (11.3) (9.6) Net interest payments mounted to \$15.9 million, with the principal expenditure on new shops, refurbishment and information systems. In addition, acquisition expenditure amounted to \$5.2 million relating to the acquisition of shops previously owned by franchisees, including \$4.3 million for goodwill.

In the year to February 2002, capital expenditure of approximately \$20 million is forecast, with the principal expenditure on shops and information systems.

Other movements of \$4.8 million include \$4.1 million of loan notes issued in consideration for the assets of The Body Shop Digital.

Interest

The net interest charge of \$4.4 million related to 374.1 330.1 Cost of sales (149.0) (130.9)

Gross profit 225.1 199.2

Operating expenses - excluding exceptional costs (195.7) (166.2) - exceptional costs (note 1) (11.2) -

Operating profit 18.2 33.0 Restructuring costs (note 1) (1.0) (2.7)

17.2 30.3

Net interest payable (4.4) (1.5)

Profit on ordinary activities before taxation 12.8 28.8 Taxation on profit on ordinary activities (3.5) (10.4) Profit for the financial year 9.3 18.4 Equity minority interests 0.2 - 9.5 18.4 Dividends paid and proposed (10.9) (10.9) Retained (loss) / \$m \$m Intangible assets 33.6 31.5 Tangible assets 71.8 68.4 Investments 5.2 4.8 110.6 104.7

Current assets Stocks 51.3 44.7 Debtors due within one year 47.8 45.9 Debtors due after more than one year 6.7 6.0 54.5 51.9 Cash at bank and in hand (1.9) (1.7) Redeemable convertible loan notes (1.4) - Provisions for liabilities and charges (0.3) (0.7) 121.7 121.7

Capital and reserves Called up share capital 9.7 9.7 Share premium

account 42.9 42.8 Profit and loss account 69.0 68.9 Shareholders' funds (all equity) 121.6 121.4 Minority equity interests 0.1 0.3

21.4 31.4

Returns on investment and servicing of finance Interest received 0.4 0.7 Interest paid (4.8) (2.2) (4.4) (1.5)

Taxation (11.3) (9.6)

Capital expenditure and financial investments Purchase of tangible fixed assets (15.9) (14.2) Purchase of other investments (0.7) (1.4) Sale of tangible fixed assets 0.9 1.8 Sale of other investments 0.3 ended ended 3 Mar 2001 26 Feb 2000 #m #m

Increase in stocks (4.5) (15.0) Increase in debtors (3.5) (2.6) (Decrease)/increase in creditors (8.3) 10.2 Other, net - 0.8 (16.3) (6.6) Analysis of changes in net debt

#m

Profit for the financial year 9.5 18.4 Currency translation differences on foreign currency net investments 1.5 (0.4) Total recognised gains and losses for the financial year 11.0 18.0

The Body Shop International PLC Segmental Analysis

3 Mar 2001 26 Feb 2000

Shop numbers

UK & Republic of Ireland 315 286 Americas 413 410 Europe & Middle East 684 636 Asia Pacific 429 398 Total 1841 1730

Comparable store sales

UK & Republic of Ireland -2% -2% Americas +5% 142.2 Total 691.4 646.6

Turnover UK & Republic of Ireland 147.9 137.4 Americas 118.5 99.5 Europe & Middle East 64.0 57.9 Asia Pacific 43.7 35.3 Total 374.1 330.1

Operating profit UK & Republic of Ireland 27.4 29.4 Americas ring costs - redundancy costs 0.3 2.0 - other 0.7 0.7 1.0 2.7

The exceptional costs of #11.2 million relate primarily to redundancy costs, impairment of fixed assets and goodwill relating to The Body Shop Digital, and the cost of supply chain development. The restructuring costs of #1.0 million (2000: #2.7 million) relate to the sale of the Littlehampton manufacturing plant and associated reorganisation costs.

2 Earnings per share millions) Dilutive effect of share options (number 1.2 0.6 in millions) 191.7 191.6

The weighted average excludes 3,581,934 (2000: 3,081,934) shares held by the Employee Share Trust.

3 Foreign currency

The results of the foreign subsidiaries have been translated using average monthly exchange rates.

4 Dividends

The Directors propose a final dividend per share of 3.8 pence payable on July 3rd 2001 to shareholders on the register at June 8th 2001.

5 Financial statements to those dates. The financial statements for both periods have received unqualified auditors' reports, those for the period ended 26 February 2000 having been filed with the Registrar of Companies and those for 3 March 2001 to be filed in due course.

The 2001 Annual Report and Accounts will be posted to shareholders on 17 May 2001 and will be available at www.the-body-shop.com. Alternatively copies can be obtained on request from the Investor Relations Department, The Body Shop International PLC, Watersmead, Little2000 * Strong cash position; #140 million in hand * Seven design licences and six additional customers won in Q1 * Licence agreements announced with Jennic, Palmchip Corporation, CellGuide, Telesoft, NeuriCam and Vaishali Semiconductor * Strategic alliances with Corelis and Aptix Corporation * Release of Tangent-A4, the latest version of our configurable microprocessor

Commenting on the results, Bob Terwilliger, Chief Executive Officer, said:

"I am pleased to announce continued turnover growth and good progress towards our commercial and financial goals during the first quarter. Our

business model of licensing our intellectual property to customers who are developing next generation products limits our exposure to the stock adjustments and production cut-backs being experienced by many technology companies.

"Our configurable microprocessor's versatility and high-performance is generating increasing interest amongst system designers. We now have 50 customers with 80 design licenses and our technology is being used successfully in an ever-expanding range.

There will be a replay of the call available from approximately 10.30.a.m. on 2 May on +44 (0) 20 8288 4459 Access code: 684172.

A recording of the call will also be audio streamed on the Investor Relations section of our website www.arccores.com from approximately 2.00 pm on 2 May.

Chief Executive's Review

We continue to develop the business successfully in line with the strategy laid down at the time of our IPO last September and the objectives we set ourselves for this year.

Turnover growth

We achieved further growth in turnover at a time when trading conditions in our customers' markets became significantly more nuncement on 28 February 2001: Jennic, Palmchip Corporation, CellGuide, Telesoft, NeuriCam and Vaishali Semiconductor.

Important strategic alliances have been formed with Corelis to provide our customers with the first JTAG emulators for developing and testing a configurable processor and with Aptix Corporation to provide a prototyping and verification environment for ARC-based system-on-chip designs.

Technological Leadership

We continue to extend our technological leadership and devote significant resources to this at our research and development centres in the UK and North America. We recently moved our San Jose facility to larger customers exploit the benefits of the configurability of ARC's microprocessor and the related intellectual property and tools from our subsidiary businesses.

An increasing number of customers are using multiple ARC processors in a single chip. The ARC Tangent was designed to be suitable for multi-processing whereas most other central processing units and digital signal processors (DSPs) are fundamentally unsuited to multi-processing. The use of multiple ARC processors in a single chip further underlines the flexibility of the product as the technology can be used to perform a variety of functions including: protocol processing, encr000 in Q3 2000. The Q4 2000 figure included a one-off benefit resulting from the release of deferred maintenance income associated with a number of special contracts in North America. Royalties were #128,000 compared with #165,000 in the previous quarter. The number of designs being shipped by our customers and contributing to royalties was unchanged from the previous quarter at 12 but total royalty income was impacted by some products passing thresholds in their royalty payment scales.

Cost of sales was unchanged from the previous quarter at #0.3 million, resulting in an identical gross margin of 92%. Total operating expenses, inclut of #0.8 million, compared with a credit of # 0.2 million in the previous quarter.

Total operating expenses excluding the provision for National Insurance contributions, depreciation and amortisation of goodwill remained unchanged from the previous quarter at #9.4 million.

Interest income was #2.0 million, compared with #2.3 million in the previous quarter.

The net loss in the quarter decreased to #4.4 million compared with #4.7 million in the previous quarter.

Net assets at 31 March 2001 were #161 million, including net cash of #140 million.

The net cash outflow from operations was #6.0 million. Capital expend
(9,011) (3,290) (26,550)

				(10,030)	(3,611)
(29,929)	Loss before interest and tax	(6,357)	(2,195)	(19,365)	Interest
receivable and similar income	1,976	102	3,008	Interest payable and similar	
charges	0	(1)	(18)	-----	Loss on
ordinary activities before tax	(4,381)	(2,094)	(16,375)	Tax on loss on	
ordinary activities	0	0	-	-----	-----
Retained loss for the period	(4,381)	(2,094)	(16,375)		

(29,929)		Total operating expenses	(10,030)	(3,611)
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ARC International plc Consolidated statement of total recognised gains and losses

For the year ended 31 March 2001	3 months ended 31 March 2001	3 months ended 31 March 2000	Year ended 31 March 2000
(audited)	(audited)	(unaudited)	(unaudited)
#'000	#'000		

[illegible]

20,624 20,415

-----	-----	Current Assets	Stock (17)	(17)
-----	-----	Net Assets	160,908	164,637

-----		-----		Capital and reserves		Called up share	
capital	274	273	Share premium account	149,405	149,061	Exchangeable shares	
5,024	5,025	Merger reserve	107	107	Profit and loss account	(18,592)	
(14,492)		Other reserves	24,690	#'000	#'000		

[illegible]

resources and financing	(5,851)	(18,249)	Net cash outflow before management of liquid
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Management of liquid resources Movement on term deposits 6,285 (137,959)

----- 1. Reconciliation of operating profit to operating cash flow
for the years ended 31 December 2000 and 1999 31 March 31 December

2001 2000

(unaudited) (audited)

' 000 # ' 000

[illegible]

3. Reconciliation of net cash flow to movement in net funds Year ended
Year ended 31 March 2001 31 December 1999 (unaudited) (audited) #000 #000

Exchange movements 87 (20) In - (56) Movement in borrowings 11 29

		Movement in funds	(5,419)	140,001	Net
funds at beginning of period	145,816	5,815			

145,816	Net funds at end of period	140,397
---------	----------------------------	---------

-----al equipment manufacturers (OEMs) as well as to semiconductor merchant vendors. ARC's technology enables designers to reduce time to market and to work with the semiconductor manufacturers and technologies of their choice.

ARC's licensees include: Austria Mikro Systeme, BrightCom, Chameleon Systems, Conexant, Fujitsu Microelectronics, Hyperchip, IBM, Infineon Technologies, SanDisk, Texas Instruments, Vtech Communications and Xemics.

With headquarters in Elstree, England, ARC International plc and its

group companies employ 302 people in research and development, sales, and marketing offices across North America and Europe. MetaWare Incd retain qualified personnel; risks associated with the Company's international operations; and other uncertainties that are discussed in the "Investment Considerations" section of the Company's listing particulars dated 28 September 2000 filed with the United Kingdom Listing Authority and the Registrar of Companies in England and Wales.

ARC International (UK) Ltd. and ARC Cores Inc., both of which are wholly owned subsidiaries of ARC International plc, trade under the name of ARC Cores.

ARC Cores is a trademark of ARC International (UK) Limited.

All other brands or product names are the property of their respective holders

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... of well-executed initiatives that are driven by market needs. We are also responding to **customer feedback** by reintroducing some of the products that have been discontinued over the past year and...

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